Drive device

CLAIMS

1. Drive device (1) for adjusting an operating element (2) for a valve, a throttle, a blow-out preventor or the like, in particular in the field of gas or oil exploitation and/or production, the operating element (2) being actively connected with at least one driving motor (4) via a drive train (3), and at least one transmission changing unit (5) being arranged in the drive train (3) for converting a revolution of the driving motor (4) into a revolution of the operating element (2), and/or a revolution/linear motion converter being arranged for converting the revolution of the driving motor (4) into a linear motion of the operating element (2), **characterized in that** the drive train (3) comprises at least one essentially disk- or wheel-shaped revolution introducing device (6) actively connected with at least two drive shafts (10, 11, 12, 13) rotated by separate driving motors (4, 7, 8, 9).

2. Drive device according to claim 1, **characterized in that** the revolution introducing device (6) comprises an external toothing (14) actively connected at certain places with the drive shafts (10, 11, 12, 13) in the peripheral direction (15) of the revolution introducing device (6).

3. Drive device according to claim 1 or 2, **characterized in that** the revolution introducing device (6) is designed as a worm wheel (16) and a worm (17, 18) is arranged at each drive shaft (10, 11, 12, 13).

4. Drive device according to one of the preceding claims, **characterized in that** the worm (17, 18) is arranged essentially centrically on a drive shaft (10, 11, 12, 13) driven by motors (4, 7, 8, 9) on both sides.

5. Drive device according to one of the preceding claims, **characterized in that** the worm (17, 18) is placed on said drive shaft (10, 11, 12, 13) in particular in a detachable fashion.

6. Drive device according to one of the preceding claims, **characterized in that** at least one driving motor (4, 7, 8, 9), in particular an electromotor, is assigned to each end (19, 20) of the drive shaft (10, 11, 12, 13).

7. Drive device according to one of the preceding claims, **characterized in that** the drive shaft (10, 11) is arranged perpendicularly to the longitudinal direction (21) of the operating element (2).

8. Drive device according to one of the preceding claims, **characterized in that** for forming a double helical gearing (30), the revolution introducing device (6) is designed as a helical gear spur wheel (22), and a helical gear drive wheel (23) is arranged on each drive shaft (12, 13).

9. Drive device according to one of the preceding claims, **characterized in that** at least two driving motors (4, 7, 8, 9) are assigned to the drive shaft (12, 13) at one end (19, 20).

10. Drive device according to one of the preceding claims, **characterized in that** between driving motors (4, 7, 8, 9) and the helical gear drive wheel (23), a step-down gear unit (24), in particular a so-called harmonic drive (25), is arranged as transmission changing unit (5).

11. Drive device according to one of the preceding claims, **characterized in that** the drive shaft (12, 13) is arranged in parallel to the longitudinal direction (21) of the operating element (2).

12. Drive device according to one of the preceding claims, **characterized in that** the drive shaft (10, 11, 12, 13) is mounted in a floating fashion.

13. Drive device according to one of the preceding claims, **characterized in that** a positioning sensor (26) is assigned to the revolution introducing device (6).

14. Drive device according to one of the preceding claims, **characterized in that** the drive train (3) comprises a rotating spindle (27) and/or a recirculating ball nut and/or a step-down gear unit (28) downstream of the revolution introducing device (6).

15. Drive device according to one of the preceding claims, **characterized in that** the drive shafts (10, 11, 12, 13) are synchronized by a mechanical coupling device (35) with a sprocket belt, a chain (37) or the like.

16. Drive device according to one of the preceding claims, **characterized in that** the driving motors (4, 7, 8, 9) are electrically synchronized.

17. Drive device according to one of the preceding claims, **characterized in that** the gears (30) consisting of worm wheel (16)/worm (17, 18) or helical gear spur wheel (22)/helical gear drive wheel (23) are self-locking.

18. Drive device according to one of the preceding claims, **characterized in that** a helical angle (29) of the teeth of the double helical gearing (30) is between 40° and 85°, in particular between 60° and 80°.

19. Drive device according to one of the preceding claims, **characterized in that** the essentially disk- or wheel-shaped revolution introducing device (6) is actively connected with the mechanical coupling device.